ABSTRACT

COMPARISON OF RUNT-RELATED TRANSCRIPTION FACTOR-2 AND ALKALINE PHOSPHATASE EXPRESSION IN HUMAN ADIPOSE DERIVED MESENCHYMAL STEM CELL CULTURE AFTER EXPOSURE TO DEMINERALIZED FREEZE DRIED BOVINE BONE XENOGRAFT WITH BOVINE HYDROXYAPATITE

Background: Bovine Hydroxyapatite (BHA) is a xenograft that was first recommended to replace autograft but lacks osteoinductive potential, thus Demineralized Freeze-Dried Bovine Bone Xenograft (DFDBBX) is introduced. DFDBBX is lack of minerals so that it leaves organic components containing growth factors; and is thought to be Bone Morphogenic Protein (BMP). Preliminary research on DFDBBX showed no cytotoxicity, having normal tissue response and undergo gradual biodegradation. Osteogenic differentiation test is needed to evaluate osteoinductive potential of DFDBBX. **Objective**: to compare the expression of RUNX-2 and ALP in human adipose derived mesenchymal stem cell (hAD-MSC) cultures after exposure to DFDBBX with BHA. **Method:** hAD-MSC cultures with cells density $1x10^5$ cells/ml were divided into 4 groups which were 2.5% DFDBBX conditioned medium, 2.5% BHA conditioned medium, positive control (osteogenic medium), and negative control group (α medium) in microplate. Observation of RUNX-2 and ALP expression was carried out after 2, 7 and 14 days using immunocytochemistry staining. Data were analyzed using Mann Whitney test, $p < 0.05$ was considered statistically significant. **Result:** RUNX-2 expression in BHA was significantly higher on days 7 ($p = 0.021$), but on day 2 ($p = 0.083$) and 14 ($p = 1$) it did not appear to be significantly different than DFDBBX. ALP expression in BHA showed significantly higher results than DFDBBX ($p = 0.021$) in all observation days. **Conclusion:** DFDBBX shows equal osteoinductive potential compared to BHA, but BHA is able to induce higher osteoblast maturation compared to DFDBBX.

Keywords: Bovine Hydroxyapatite, Demineralized freeze-dried bovine bone xenograft, Runt-Related Transcription Factor-2, Alkaline Phosphatase, human adipose derived mesenchymal stem cell